
SEABORG
making nuclear sustainable
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SEABORG

We are Seaborg Technologies, a Danish clean-tech start-up in the sustainable energy industry. We have developed a new type of thorium-based Molten Salt Reactor (MSR), an inherently safe reactor type that will surpass all existing energy sources in terms of economics, sustainability, and fuel availability.

MOLTEN SALT REACTORS

Molten Salt Reactors (MSRs) will disrupt sustainable power production. The MSR is a fundamentally new type of nuclear reactor, which solves the problems that plague conventional nuclear power while producing abundant, clean, carbon-free energy.

The magic trick is the liquid fuel - the molten salt - which results in inherent safety. This means that the MSR cannot explode nor melt down. If something goes awry, the reactor simply shuts itself down. The principle of safety-by-physics rather than safety-by-engineering makes these reactors economically superior to conventional nuclear reactors, that rely on expensive engineering solutions and redundant accident mitigation systems to ensure safety. Furthermore, the salt chemically binds the normally volatile fission products, and thus even in the most severe accident scenarios dangerous radioactive elements do not enter the biosphere.

Alongside the unprecedented safety features and competetive economics, the MSR has a long list of additional benefits, e.g. higher thermal efficiency, a wide range of fuel options, excellent load following capabilities, process heat applications, etc.

THE SEABORG DESIGN

In our design we have made a series of deliberate design decisions in order to capitalise on all inherent MSR benefits while adding our own extra advantages. It combines the best of established MSR technologies with ground-breaking innovations in reactor core materials.

Seaborg's design touts a set of features unmatched by any other MSR design:

- Unparalleled non-proliferation profile
- Excellent waste-burning abilities using thorium as catalyst
- Ultra-compact form factor, five times smaller core suited for mass production

These design choices and the derived benefits give us access to a new large market for Small Modular Reactors (SMR), where Seaborg will dominate.

> We now want to move forward towards our ultimate goal – to build our first reactor. We are looking for visionary investors to join us – who are bold and share our vision for a future with clean, safe, cheap and abundant energy.

Our proprietary design is vastly superior to any competing MSR technology in terms of size, non-proliferation and fuel economy.

The world is currently battling a trade-off between access to cheap and abundant energy, while at the same time trying to phase out fossil-based energy sources to reduce pollution and CO_2 emissions.

At the COP21 climate conference in Paris, 177 nations signed a memorandum of understanding (MoU) with the common goal of limiting global warming to less than two degrees. To reach these goals, the MoU agrees that nuclear power must double its output and become the largest contributer to electricity production by 2050. This represents an investment of USD 4.5 trillion in construction costs alone, deploying conventional nuclear technologies. This has given rise to a strong renewed focus on new nuclear-based technologies, particularly thorium and MSRs.

MSRs are the only true economic and safe alternative to conventional reactor types, which are immensely expensive to build and have a variety of issues.

NO WEAPONS!

It is a key design choice to make our reactor proliferation-proof. This can only be achieved in a single-salt, thermal-spectrum MSR. Furthermore, our chemistry system cannot be used to extract weapon-usable material and our fuel cycle is designed so that no element is of weapon-grade quality at any stage in the reactor life cycle.
This unique Seaborg approach opens new and untapped markets inaccessible to other designs.

Our reactor design has already been internationally validated as one of six competing MSR designs, and is deemed fit for further development. Our design is also included in the IAEA technology portfolio, and Seaborg represents Denmark on the IAEA MSR board.

WASTE BURNING

An innovative hallmark of our reactor design is that it uses thorium as a catalyst for converting spent nuclear fuel to energy. But what does that really mean?

Spent Nuclear Fuel (SNF) is used fuel rods from a conventional nuclear reactor. This consists mostly of depleted uranium, together with fission products and transuranic elements. The fission products are the lighter nuclei that result from splitting the atoms. They are typically characterised by a short half-life, so that only a manageable storage period is required to reduce the radioactivity to safe levels. The transuranic elements are created from neutrons converting uranium into heavier elements, such as plutonium. These generally have long half-lives, and are the reason why SNF today must be kept in storage for hundreds of thousands of years.

Our reactor converts these transuranic elements into energy and short-lived fission products. By doing this we eliminate the need for expensive long-term storage of SNF.

Seaborg Technologies has a young and highly motivated team with a strong technical background from leading research institutions like the Niels Bohr Institute, European Spallation Source, and CERN. We are already recognized as the only purebred MSR design service house, delivering knowledge and computational assistance to a select few MSR companies around the world.

Our proprietary use of a novel reactor core material results in an extremely compact reactor form factor. Our deliberate design choices unlock new markets, and our form factor intellectual property secures our position on these.

Seaborg Technologies is one of only a few global MSR companies which strive to commercialize the safe, clean and cheap MSR technology – among others Bill Gates has invested in one, Peter Thiel in another, and some have begun development and even prototype construction in China.

FIVE TIMES SMALLER

Our unique intellectual property reduces the core size with more than a factor of five compared to other MSR designs. This gives our reactor a superior form factor and exceptional scalability. This opens up a host of currently untapped markets, including industries such as shipping, mining, water purification and high-temperature metal works, remote communities, decentralised grid, etc. - where Seaborg will be the dominant player.

MAKING NUCLEAR SUSTAINABLE

Our unique use of thorium not only facilitates waste burning capability in a thermal spectrum proliferation-proof reactor, it also makes nuclear sustainable on a longer timescale. The waste salt from the Seaborg reactor remaining at the end of its lifetime can be used to fuel new Seaborg reactors operating directly on thorium – and thus supply energy for everyone for tens or hundreds of millennia. As such, our reactor effectively makes nuclear sustainable.

If you share and believe in our vision of a future with abundant, clean, cheap, safe energy for all, then we want to talk to you.

Contact us:
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